

CLAIMS

We claim:

1. An impeller for a regenerative turbine pump, said impeller comprising:

5 (a) a hub defining an aperture at a center thereof into which a shaft of said turbine pump is securable to allow said hub to rotate about a center axis therewith;

(b) an outer ring concentric to said hub; and

(c) a plurality of vanes extending from an outer surface of said hub to an inner surface of said outer ring with each said vane comprising an entrance portion that extends from said outer surface and an exit portion that extends from said entrance portion to said inner surface, each of said vanes (i) having a V-shape of a prespecified angle centered relative to a plane normal to said center axis and (ii) being at least partially non-linear on at least one of an upstream face and downstream face of said vane from said entrance portion thereof through said exit portion thereof, said entrance and said exit portions of each said vane each having a pair of outer sidewalls, each of said outer sidewalls of each said entrance portion being chamfered along a trailing corner thereof at a predetermined angle relative to said plane.

2. The impeller claimed in claim 1 wherein each of said outer sidewalls of each said exit portion are chamfered along a trailing corner thereof at said predetermined angle relative to said plane.

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3. The impeller claimed in claim 1 wherein said predetermined angle relative to said plane is substantially equal to an angle at which a fuel stream within said turbine pump approaches said outer sidewalls of said entrance portions.

4. The impeller claimed in claim 1 wherein said predetermined angle lies within a range of 15° to 45° relative to said plane.

5. The impeller claimed in claim 4 wherein said predetermined angle is 30° relative to said plane.

6. The impeller claimed in claim 1 wherein said prespecified angle lies within a range of 50° and 130° for said upstream face of said vane.

7. The impeller claimed in claim 6 wherein said prespecified angle is 90° for said upstream face of said vane.

8. The impeller claimed in claim 1 wherein said prespecified angle lies within a range of 80° and 86° for said downstream face of said vane.

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9. The impeller claimed in claim 8 wherein said prespecified angle is 82.3° for said downstream face of said vane.

10. The impeller claimed in claim 1 wherein said aperture defined in said hub is notched to permit said impeller to be securely fitted onto said shaft of like shape.

11. An impeller for a regenerative turbine pump, said impeller comprising:

(a) a hub defining an aperture at a center thereof into which a shaft of said turbine pump is securable to allow said hub to rotate about a center axis therewith;

(b) an outer ring concentric to said hub; and

(c) a plurality of vanes extending from an outer surface of said hub to an inner surface of said outer ring with each said vane comprising an entrance portion that extends linearly outward from said outer surface and an exit portion that extends

1 linearly from said entrance portion to said inner surface, each
of said vanes having a V-shape of a prespecified angle centered
relative to a plane normal to said center axis with said exit
portion thereof being inclined forward of said entrance portion
5 so as to advance toward said inner surface of said outer ring at
an exit angle with respect to a direction of rotation of said
impeller, said entrance and said exit portions each having a
pair of outer sidewalls, each of said outer sidewalls of each
said entrance portion being chamfered along a trailing corner
thereof at a predetermined angle relative to said plane.

12. The impeller claimed in claim 11 wherein each of said
outer sidewalls of each said exit portion are chamfered along a
trailing corner thereof at said predetermined angle relative to
said plane.

13. The impeller claimed in claim 11 wherein said
predetermined angle relative to said plane is substantially
equal to an angle at which a fuel stream within said turbine
20 pump approaches said outer sidewalls of said entrance portions.

14. The impeller claimed in claim 11 wherein said predetermined angle lies within a range of 15° to 45° relative to said plane.

5 15. The impeller claimed in claim 14 wherein said predetermined angle is 30° relative to said plane.

16. The impeller claimed in claim 11 wherein said prespecified angle lies within a range of 50° and 130° for said upstream face of said vane.

17. The impeller claimed in claim 16 wherein said prespecified angle is 90° for said upstream face of said vane.

18. The impeller claimed in claim 11 wherein said prespecified angle lies within a range of 80° and 86° for said downstream face of said vane.

19. The impeller claimed in claim 18 wherein said prespecified angle is 82.3° for said downstream face of said vane.

said entrance portion being chamfered along a trailing corner thereof at a predetermined angle relative to said plane.

22. The impeller claimed in claim 21 wherein each of said
5 outer sidewalls of each said exit portion are chamfered along a trailing corner thereof at said predetermined angle relative to said plane.

23. The impeller claimed in claim 21 wherein said predetermined angle relative to said plane is substantially equal to an angle at which a fuel stream within said turbine pump approaches said outer sidewalls of said entrance portions.

24. The impeller claimed in claim 21 wherein said predetermined angle lies within a range of 15° to 45° relative to said plane.

25. The impeller claimed in claim 24 wherein said predetermined angle is 30° relative to said plane.

26. The impeller claimed in claim 21 wherein said prespecified angle lies within a range of 50° and 130° for said upstream face of said vane.

